UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
OSB2000-0219

September 11, 2000

Mr. Lawrence C. Evans
Chief, Regulatory Branch
US Corps of Engineers, Portland District
P.O. Box 2870
Portland, OR 97208-2870

Re: Biological Opinion for the McKenzie River Bank Stabilization Project
(Corps No. 2000-00342)

Dear Mr. Evans:

The National Marine Fisheries Service (NMFS) has enclosed the biological opinion (Opinion) that addresses the proposed McKenzie River bank stabilization project in Lane County, Oregon. The biological assessment (BA) was received on August 14, 2000, and additional information received August 21, 2000. The Oregon Department of Transportation is the lead agency, and the work will be carried out by their maintenance staff using state funding.

This Opinion considers the potential effects of the project on Upper Willamette chinook salmon (*Oncorhynchus tshawytscha)* which occur in the proposed project area. Upper Willamette chinook were listed as threatened under the ESA by the NMFS on March 24, 1999 (64 CFR 14308) and critical habitat was designated on February 16, 2000 (65 FR 7764). This Opinion constitutes formal consultation for the Upper Willamette chinook salmon. The NMFS concludes that the proposed action is not likely to jeopardize the subject species or destroy, or adversely modify, critical habitat. Included in the enclosed Opinion is an incidental take statement with terms and conditions to minimize the take of the subject species.

Questions regarding this letter should be directed to Pat Oman of my staff in the Oregon State Branch Office at (503) 231-6892.

Sincerely,

For Michael R Crouse

William Stelle, Jr.
Regional Administrator

cc: Rose Owens - ODOT
Greg Apke - ODOT (attachment)
Alan Lively - ODOT (attachment)
Randy Reeve - ODFW (attachment)

Endangered Species Act - Section 7
Consultation

BIOLOGICAL OPINION

McKenzie River Bank Stabilization Project
Clear Lake-Belknap Springs Highway
Lane County, Oregon

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Date Issued: September 11, 2000

Refer to: OSB2000-0219

TABLE OF CONTENTS

I. BACKGROUND

On August 14, 2000, the National Marine Fisheries Service (NMFS) received a request from the U.S. Army Corps of Engineers (USCOE) for Endangered Species Act (ESA) section 7 formal consultation for the McKenzie River bank stabilization project. The project will repair two localized scour areas along the highway. Riprap will be placed into the roadfill voids to stabilize the failed embankments. A toe trench will not be utilized. The embankment fill material will be planted with 100 willow cuttings. The project applicant is the Oregon Department of Transportation (ODOT). The ODOT has designed the project and will construct the project with maintenance staff. The project is funded from the ODOT Maintenance budget, which uses state tax dollars. The federal nexus for the ESA consultation is the USCOE fill permit.

The McKenzie River is a tributary of the Willamette River, which flows into the Columbia River. The project site is at approximately river mile 77, in Township 15 S, Range 6 E on the Belknap Springs USGS topographic 7.5' quad. It is at mile post 15.4 on the Clear Lake-Belknap Springs Highway in Lane County, Oregon. The USCOE/ODOT is proposing to place 500 cubic yards of riprap along the left bank (looking downstream) of the river; of this, 400 cubic yards would be within the Ordinary High Water (OHW) zone.

The USCOE/ODOT determined that the proposed action is likely to adversely affect the Upper Willamette (UW) chinook salmon which are present in the project area. The effects determination was made using the methods described in Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale (NMFS 1996).

This biological opinion (Opinion) is based on the information presented in the biological assessment (BA) and the result of the consultation process. The consultation process has involved a site visit, and correspondence and communications to obtain additional information and clarify the BA. As appropriate, modifications to the proposal to reduce impacts to the indicated species were discussed and enacted. This has included minimizing the amount of riprap proposed and the addition of plantings to the design.

The objective of this Opinion is to determine whether the action to stabilize the stream bank and place riprap is likely to jeopardize the continued existence of the UW chinook salmon, or destroy or adversely modify critical habitat.

II. PROPOSED ACTION

The proposed action will place an estimated 500 cubic yards of riprap at two sites along the left bank (looking downstream) of the McKenzie River at the project location described above. One of the sections is 18 feet long and will be above the Ordinary High Water line. The other section is 64 feet long, will require approximately 400 cubic yards of rock, and will take place within the OHW. To carry out the slide repairs, guardrail sections will be temporarily removed to provide access for the

excavator. After geotextile material has been placed, rock material will be trucked in from a US Forest Service quarry and an excavator will be used to place the riprap directly from the dump truck into the roadfill voids. After the placement of the riprap the guardrail will be re-assembled and replaced. This stabilization work is estimated to take one to two days.

III. BIOLOGICAL INFORMATION AND CRITICAL HABITAT

The UW chinook salmon Evolutionarily Significant Unit (ESU) was listed as threatened under the ESA by the NMFS on March 24, 1999 (64 CFR 14308). Biological information on UW chinook salmon may be found in the Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California (Myers et al. 1998). Critical habitat was designated for the UW chinook salmon on February 16, 2000 (65 FR 7764). Critical habitat for UW chinook salmon consists of all waterways below naturally impassable barriers including the project area. The adjacent riparian zone is also included in the designation. This zone is defined as the area that provides the following functions: shade, sediment, nutrient/chemical regulation, streambank stability, and input of large woody debris/organic matter. Protective regulations for UW chinook salmon were issued under section 4(d) of the ESA on July 10, 2000 (65 FR 42423).

IV. EVALUATING PROPOSED ACTIONS

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). NMFS must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the: (1) Definition of the biological requirements and current status of the listed species; and (2) evaluation of the relevance of the environmental baseline to the species' current status.

Subsequently, NMFS evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NMFS must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmonid's life stages that occur beyond the action area. If NMFS finds that the action is likely to jeopardize the listed species, NMFS must identify reasonable and prudent alternatives for the action.

Furthermore, NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' designated critical habitat. The NMFS must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. The NMFS identifies those effects of the action that impair the function of any essential element of critical habitat. The NMFS then considers whether such impairment appreciably

diminishes the habitat's value for the species' survival and recovery. If NMFS concludes that the action will destroy or adversely modify critical habitat, it must identify any reasonable and prudent alternatives available.

For the proposed action, NMFS' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NMFS' critical habitat analysis considers the extent to which the proposed action impairs the function of essential biological elements necessary for juvenile and adult migration, and juvenile rearing of the UW chinook salmon.

A. Biological Requirements

The first step in the methods NMFS uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NMFS also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess to the current status of the listed species, NMFS starts with the determinations made in its decision to list UW chinook salmon for ESA protection and also considers new data available that is relevant to the determination (Myers et al, 1998).

The relevant biological requirements are those necessary for UW chinook salmon to survive and recover to naturally reproducing population levels at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful migration, spawning, holding, and rearing. The current status of the UW chinook salmon, based upon their risk of extinction, has not significantly improved since the species was listed and, in some cases, their status may have worsened. Adult returns to the McKenzie River have declined from highs of 10,000 - 13,000 during 1988 to 1991, to recent low levels of 3,000 - 4,000 from 1994 to1998. Of all the areas of habitat for UW chinook salmon, the McKenzie River watershed is critical to maintaining this ESU, as noted in the January, 1999 Oregon Department of Fish and Wildlife stock status report:

> The McKenzie basin is the most important remaining area for natural production of spring chinook in the Willamette Basin. Although heavily influenced by hatchery fish, the wild population of spring chinook in the McKenzie River is the most productive in the Willamette gene conservation group. Although dams on tributaries (Blue River and South Fork) have eliminated some historic spawning areas, fish still have access to relatively undisturbed spawning and rearing habitat. The McKenzie River continues to be capable of producing at least several thousand wild adults, despite habitat alterations such as gravel operations and channelization in the lower McKenzie and Willamette rivers, an unscreened 2400 cfs hydroelectric diversion, and flood control reservoirs in the upper watershed. Current adult escapement is believed to be much less than the number required to fully seed the habitat. (Oregon Department of Fish and

Wildlife: January, 1999 stock status report at *www.dfw.state.or.us/springfield/McKChs.htm*.)

B. Environmental Baseline

The current range-wide status of the identified ESU may be found in Myers et al. (1998). The identified action will occur within the range of UW chinook salmon. The defined action area is the area that is directly and indirectly affected by the action. The direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect affects may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions contributing to stream degradation. As such, the action area for the proposed activities include the immediate watershed where the riprap and bridge rehabilitation will occur, and those areas upstream and downstream that may reasonably be affected, temporarily or in the long term. For the purposes of this Opinion, the action area is defined as the streambed and streambank of the McKenzie River extending upstream to the edge of disturbance, and extending downstream 100 feet. Other areas of the McKenzie River watershed are not expected to be directly or indirectly impacted.

This stretch of the McKenzie River is not listed on the Oregon Department of Environmental Quality's 303(d) list of water quality limited streams. Downstream from the project area, from Leaburg Dam to the mouth of the McKenzie, the river is listed for summer temperatures. The dominant land use within this reach is mature timber, and the streamside vegetation is primarily mature forest canopy dominated by conifers. Within the boundaries of the project there is little riparian vegetation (three to six small alder trees) and minimal riparian function.

Within the mainstem of the McKenzie River there has been a loss of off-channel habitat because of dam and road construction. This has reduced the overall habitat complexity, which results in changes in species abundance, composition, and distribution. In the immediate vicinity of the project, the river runs through a steep v-shaped narrow valley channel constrained by hillslopes. The gradient is moderate with a gravel/cobble substrate. Adjacent to the area of riprap placement the river is characterized as a riffle, with a fast, turbulent, shallow flow. The condition of riparian vegetation is poor, and large woody debris is not present.

UW chinook occur throughout the McKenzie River and its tributaries. Adult spring chinook salmon require deep pools within reasonable proximity to spawning areas where they hold and mature for several months between migration and spawning. Preferred spawning and rearing areas have a low gradient (generally less than 3%), but adults often ascend much higher gradient reaches to find desirable spawning areas. The project area is primarily migratory habitat for adult and juvenile chinook salmon; spawning does not occur due to high water velocity. Potential spawning habitat is located about 1,000 feet upstream of the project area.

Based on the best available information on the current status of UW chinook salmon range-wide; the population status, trends, and genetics; and the poor environmental baseline conditions within the action

area, NMFS concludes that the biological requirements of the identified ESU within the action area are not currently being met. The McKenzie River has degraded habitat resulting from forestry practices, water diversions, urbanization, recreation, mining, and severe recent flooding. The following habitat indicators are either at risk or not properly functioning within the action area: temperature, turbidity/sediment, chemical contamination/nutrients, substrate, large woody debris, off-channel habitat, pool frequency and quality, refugia, streambank condition, floodplain connectivity, peak/base flows, and disturbance history. Actions that do not maintain or restore properly functioning aquatic habitat conditions would be likely to jeopardize the continued existence of UW chinook salmon.

V. ANALYSIS OF EFFECTS

A. Effects of Proposed Action

The effects determination in this Opinion was made using a method for evaluating current aquatic conditions, the environmental baseline, and predicting effects of actions on them. This process is described in the document Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale (NMFS 1996). The effects of actions are expressed in terms of the expected effect - restore, maintain, or degrade - on aquatic habitat factors in the project area.

The current status of the site is degraded because of the lack of riparian vegetation, the lack of large woody debris (instream structure), the lack of flow refugia, the proximity of the highway to the river, and the effects of existing riprap on channel morphology, water temperatures, and salmonid behavior.

The proposed action has the potential to cause the following impacts to UW chinook or designated critical habitat:

1. The use of riprap has the potential to change salmonid migration and rearing behavior. Reduced densities of chinook have been found in the vicinity of riprap-stabilized banks that do not incorporate large woody debris (Beamer and Henderson, 1998). These effects are expected to be long term, but localized.

2. Any in-water work has the potential to increase erosion from the streambank, and turbidity in the river. Localized increases of erosion/turbidity during in-water work will likely displace UW chinook and other fish in the project area and disrupt normal behavior. These effects are expected to be temporary and localized.

The effects of these activities on UW chinook and aquatic habitat will be limited by implementing construction methods and approaches, included in the project design, that are intended to avoid or minimize impacts. These include:

1. A total of 100 willow cuttings will be planted on 1.6 foot centers throughout the riprap. The willow plantings will consist of 50 *Salix sitchensis* and 50 *Salix scouleriana* cuttings.

2. Vegetation will be removed, if necessary, by cutting at ground level rather than grubbing out of the soil. No trees will be cut; the small alder trees within the project area will be maintained by placing riprap around them in such a manner as to avoid crushing the tree trunks.

3. Riprap will be placed during the low-water season, so that the water surface elevation of the river is at or below the lowest elevation of the embankment fill material, except in limited instances. Some larger rocks may be placed into the flowing stream; however, careful placement of large, clean boulders will minimize turbidity and other impacts to fish.

4. Heterogeneous margin habitat for young of the year salmonids will be provided by the placement of large fish rocks (1000 class) at the toe of the slope.

5. Geotextile fabric will be used prior to placement of riprap in order to minimize erosion.

B. Effects on Critical Habitat

NMFS designates critical habitat based on physical and biological features that are essential to the listed species. Essential features for designated critical habitat include substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage. Critical habitat for UW chinook salmon consists of all waterways below naturally impassable barriers including the project area. The adjacent riparian zone is also included in the designation. This zone is defined as the area that provides the following functions: Shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter.

The proposed actions will affect critical habitat. In the short term, temporary increase of sediments and turbidity and disturbance of riparian habitat is expected. In the long term, a slow recovery process will occur as the plants mature. Also, habitat complexity will be increased at the site by the addition of the large rocks. The NMFS does not expect that these actions will diminish the value of the habitat for survival of UW chinook salmon.

C. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." The action area has been defined as the immediate project area upstream to the edge of disturbance and extending downstream 100 feet beyond the edge of disturbance. A wide variety of actions occur within the McKenzie River basin, within which the action area is located. NMFS is not aware of any significant change in such non-Federal activities that are reasonably certain to occur. NMFS assumes that future private and State actions will continue at similar intensities as in recent years. Future ODOT transportation projects are planned in the

McKenzie River watershed. Each of these projects will be reviewed through separate section 7 consultation processes and therefore are not considered cumulative effects.

VI. CONCLUSION

After reviewing the current status of Upper Willamette chinook salmon, the environmental baseline for the action area, the effects of the proposed McKenzie River Bank Stabilization Project and the cumulative effects, it is the NMFS biological opinion that this project, as proposed, is not likely to jeopardize the continued existence of the Upper Willamette chinook salmon, and is not likely to further destroy or adversely modify designated critical habitat. NMFS applied its evaluation methodology (NMFS 1996) to the proposed action and found that it would cause minor, short-term adverse degradation of anadromous salmonid habitat due to sediment/turbidity impacts and habitat loss. This conclusion is based on findings that the proposed action will minimize death or injury to UW chinook by adhering to in-water work timing guidelines, controlling erosion and sedimentation, and restoring riparian vegetation.

The disturbed riparian area is all within the critical habitat for UW chinook salmon. The bank stabilization and planting activities will increase the likelihood that riparian function at the site will be restored in the long term; however, it will take at least five years of willow growth before functions begin to return.

VII. REINITIATION OF CONSULTATION

This concludes formal consultation on the McKenzie River bank stabilization project. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: 1) The amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or 4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

VIII. REFERENCES

Section 7(a)(2) of the ESA requires biological opinions to be based on "the best scientific and commercial data available." This section identifies the data used in developing this Opinion.

Beamer, E.M., and R.A. Henderson, 1998. Juvenile Salmonid Use of Natural and Hydromodified Bank Habitat in the Mainstem Skagit River, Northwest Washington. Fisheries and Environmental Services for the Swinomish Tribal Community, Upper Skagit and Sauk-Suiattle Indian Tribes.

DEQ 1998. 303d List of Water Quality Limited Streams, as Required Under the Clean Water Act. Oregon Department of Environmental Quality (DEQ), Portland, Or. 1998. (www.deq.state.or.us/wq/303dlist/303dpage.htm).

DSL 1996. Essential Indigenous Salmonid Habitat, Designated Areas, (OAR 141-102-030). Oregon Division of State Lands. Portland, Or. 1996.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples, 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Technical Memo. NMFS-NWFWC-35, 443 p.

NMFS (National Marine Fisheries Service) 1996. Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon.

ODFW 1999. McKenzie River Spring Chinook Stock Status Report. Oregon Department of Fish and Wildlife, Springfield, Or. January, 1999. (www.dfw.state.or.us/springfield/McKChs.htm.)

IX. INCIDENTAL TAKE STATEMENT

Sections 4 (d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with
the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

A. Amount or Extent of the Take

The NMFS anticipates that the action covered by this Opinion has more than a negligible likelihood of resulting in incidental take of UW chinook salmon because of detrimental effects from increased sediment levels (non-lethal) and the potential for direct incidental take during the placement of riprap in the riparian area (lethal and non-lethal). Effects of actions such as the placement of riprap are largely unquantifiable in the short-term, and are not expected to be measurable as long-term harm to habitat features or by long-term harm to chinook salmon behavior or population levels. Therefore, even though NMFS expects some low level incidental take to occur due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species itself. In instances such as these, the NMFS designates the expected level of take as "unquantifiable." Based on the information in the biological report, NMFS anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this Opinion. The extent of the take includes the river and associated riparian habitat in the area of riprap placement on the streambed and streambank of the McKenzie River, extending upstream to the edge of disturbance, and extending downstream 100 feet.

B. Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimizing take of the above species.

1. To minimize the amount and extent of incidental take from riprap placement activities adjacent to the McKenzie River, measures shall be taken to limit the duration and extent of rock

placement in the riparian area, and to schedule such work when the fewest number of fish are expected to be present.

2. To minimize the amount and extent of incidental take from construction activities near the river, effective erosion and pollution control measures shall be developed and implemented to minimize the movement of soils and sediment both into and within the river, and to stabilize bare soil over both the short term and long term.

3. To minimize the amount and extent of take from loss of instream habitat and to minimize impacts to critical habitat, measures shall be taken to avoid impacts to riparian and instream habitat, or where impacts are unavoidable, to replace lost riparian and instream function.

4. To ensure effectiveness of implementation of the reasonable and prudent measures, all erosion control measures and plantings for site restoration shall be monitored and evaluated both during and following construction.

C. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the USCOE/ODOT must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement Reasonable and Prudent Measure #1, above, the USCOE/ODOT shall require completion of the following:

    a. All work will be done within the time recommended by the ODFW district biologist and watershed manager and before the beginning of adult migration.

    b. All work will be staged from the highway, with all equipment operating from the elevation of the highway. No equipment entry into the 2-year floodplain will occur.

    c. Containment measures adequate to prevent construction materials from entering any waterway shall be implemented.

    d. Riprap will be placed individually and not end-dumped.

2. To implement Reasonable and Prudent Measure #2, above, the USCOE/ODOT shall be required to complete the following:

    a. Geotextile fabric will be installed prior to riprap placement.

    b. Vehicle maintenance, re-fueling of vehicles and storage of fuel shall be done at least 150 feet from the 2-year flood elevation or in an adequate fueling containment area (to

be approved by NMFS). All other staging will occur at least 150 feet from the 2-year floodplain.

c. At the end of each work shift, vehicles shall be stored greater than 150 feet (horizontal distance) from the 2-year flood elevation, or in an area approved by the project manager.

3. To implement Reasonable and Prudent Measure #3, above, the USCOE/ODOT shall be required to complete the following:

a. A total of 100 willow cuttings will be planted on 1.6 ft centers throughout the riprap. The willow plantings will consist of 50 *Salix sitchensis* and 50 *Salix scouleriana* cuttings. Cuttings will be inserted through the riprap at points where the lower ends of the sprigs will contact wet soil.

b. Three large "fish rocks" will be placed at the toe of the slope to provide flow refugia habitat for juvenile fish along the margins of the river.

4. To implement Reasonable and Prudent Measure #4, above, the USCOE/ODOT shall be required to complete the following:

a. All significant riparian replant areas will be monitored for a minimum 3-year period to ensure the following:

i. Finished grade slopes and elevations will perform the appropriate role for which they were designed.
ii. Plantings are performing correctly and have an adequate success rate. An adequate success rate is 90%.

b. Failed plantings and structures will be replaced, if replacement would potentially succeed.